	Application No.	Applicant(s)
Notice of Allowability	10/091,565	BLAYVAS ET AL.
	Examiner	Art Unit
	Belix M. Ortiz	2164

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☐ This communication is responsive to _____.

2. ☒ The allowed claim(s) is/are *1-38*.

3. ☒ The drawings filed on *3/7/2002* are accepted by the Examiner.

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a) ☐ All   b) ☐ Some*   c) ☐ None   of the:

        1. ☐ Certified copies of the priority documents have been received.

        2. ☐ Certified copies of the priority documents have been received in Application No. _____ .

        3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

    * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.

    (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached

        1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.

    (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of

    Paper No./Mail Date _____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)

2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)

3. ☒ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date *10/07/2002*

4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material

5. ☐ Notice of Informal Patent Application (PTO-152)

6. ☒ Interview Summary (PTO-413), Paper No./Mail Date *10/13/2004* .

7. ☒ Examiner's Amendment/Comment

8. ☒ Examiner's Statement of Reasons for Allowance

9. ☐ Other _____.

CHARLES RONES
PRIMARY EXAMINER

DETAILED ACTION

EXAMINER'S AMENDMENT

1. The following is an Examiner's statement of reasons for the indication

of allowable subject matter: The prior art of record does not disclose,

make obvious, or otherwise suggest the structure of the applicant's

processing apparatus, training apparatus, updating apparatus,

computer-implemented, and computer-readable together with the other

limitations of the independent claims.

The dependent claims being further limiting and definite are also
allowable. Any comments considered necessary by applicant must be
submitted no later than the payment of the Issue Fee and, to avoid
processing delays, should preferably **accompany** the Issue Fee. Such
submissions should be clearly labeled "Comments on Statement of
Reasons for Allowance"

Authorization for this examiner's amendment was given in an

interview with Sol Sheinbein on October 13, 2004.

AMENDMENT TO THE CLAIMS:

Claims 1, 18, 22, 28-29, 31-32, 34, 36, and 38 have been

amended. Claims 1-38 remain pending in the application.

WHAT IS CLAIMED IS

1. (Currently amended) Data processing apparatus for evaluating

answers to respective query items considered to be represented by

respective points within a region of feature space, which region is

subdivided into subregions according to at least first and second

subdivisions, said apparatus comprising:

an input which receives such a query item;

a subregion identifying portion operable, for each said subdivision of said region, to identify which said subregion of the subdivision contains the point representing the received query item;

a partial answer retrieval portion having access when the apparatus is in use to a store of precalculated partial answers for at least some said subregions of said subdivisions, and operable to retrieve from the store the partial answers for the [[or each]] identified subregion that is present in the store;

an answer calculation portion which calculates an answer to said received query item based on the retrieved partial answers; and

an output which outputs the calculated answer.

2. (Original) Data processing apparatus according to claim 1, wherein said answer calculation portion calculates an answer to said received query item by summing said retrieved partial answers.

3. (Original) Data processing apparatus according to claim 1, wherein one of said subdivisions contains a single subregion.

4. (Original) Data processing apparatus according to claim 3, wherein said single subregion covers the whole of said region of feature space under consideration.

5. (Original) Data processing apparatus according to claim 1, wherein each said subdivision represents a particular level of resolution and the region of feature space is subdivided into subregions of a particular size according to the level of resolution for the subdivision concerned.

6. (Original) Data processing apparatus according to claim 5, wherein the second subdivision has a higher level of resolution than the first subdivision, and so on for further subdivisions, if any.

7. (Original) Data processing apparatus according to claim 5, wherein the region of feature space is subdivided into 2^{LD} subregions, where L is the level of resolution and D is the dimension of feature space.

8. (Original) Data processing apparatus according to claim 1, wherein the subregions of any one subdivision are non-overlapping with another subregion of that subdivision.

9. (Original) Data processing apparatus according to claim 1, wherein said partial answer retrieval portion is operable to retrieve from said store further partial answers for one or more subregions surrounding the or each subregion identified by said subregion identifying portion, and said answer calculation portion calculates an answer to said received query item based on the retrieved partial answers for all such subregions.

10. (Original) Data processing apparatus according to claim 9, wherein said answer calculation portion calculates an answer to said received query item by forming a weighted sum of said retrieved partial answers, the weight for a particular partial answer being set in dependence upon the distance of the surrounding subregion associated with that partial answer from the subregion identified by said subregion identifying portion.

11. (Original) Data processing apparatus according to claim 1, wherein said answer is considered to be represented by a point within a region output space of one or more dimensions.

12. (Original) Data processing apparatus according to claim 1, wherein a query item comprises a set of measurement values and said answer represents a class assignment or decision based on those measurement values.

13. (Original) Data processing apparatus according to claim 1, wherein the apparatus is a learning machine which approximates an arbitrary decision function.

14. (Original) Data training apparatus for analyzing query items, considered to be represented by respective training points within a region of feature space, and respective known answers to the query items to determine partial answers for use in evaluating answers to new query items, said apparatus comprising:

a region subdividing portion operable to subdivide said region into subregions according to at least first and second subdivisions;

an iteration portion which performs at least first and second iterations, corresponding respectively to said first and second subdivisions, and operable in each said iteration to calculate a partial answer for each subregion of the corresponding subdivision in dependence upon known answers to query items represented by training points, if any, in the subregion concerned and to adjust said known answers in dependence upon those partial answers so that the adjusted known answers are usable by a subsequent iteration, if any; and

an output which outputs the calculated partial answers.

15. (Original) Data training apparatus according to claim 14, wherein said partial answer for each subregion is calculated as the

average of all the known answers to query items represented by training

points, if any, in the subregion concerned.

16. (Original) Data training apparatus according to claim 14,

wherein said iteration portion is operable in each said iteration to calculate

a partial answer for each subregion of the corresponding subdivision in

dependence both upon known answers to query items represented by

training points, if any, in the subregion concerned and upon known

answers to query items represented by training points, if any, in one or

more subregions surrounding the subregion concerned.

17. (Original) Data training apparatus according to claim 14,

wherein said iteration portion is operable in each said iteration to calculate

a count value for each subregion of the corresponding subdivision in

dependence upon the number of known answers to query items

represented by training points, if any, in the subregion concerned, the

apparatus further comprising an additional output which outputs the

calculated count values.

18. (Currently amended) Data training apparatus according to claim

14, wherein said known answers are adjusted by subtracting from [[them]]

said known answer the corresponding respective partial answers.

19. (Original) Data training apparatus according to claim 14, further comprising a storage portion which is operable to store said calculated partial answers.

20. (Original) Data training apparatus according to claim 19, wherein said storage portion allocates a storage location within the storage portion to hold a partial value for a subregion only if that subregion has at least one query item represented by a training point in the subregion.

21. (Original) Data training apparatus according to claim 20, wherein said storage portion is of a sparse grid type.

22. (Currently amended) Data updating apparatus for analyzing training query items and respective known answers to the training query items, said training query items being considered to be represented by respective training points within a region of feature space and said region being subdivided into subregions according to at least first and second subdivisions, to update precalculated partial answers usable to evaluate answers to new query items, said apparatus comprising:

an input which receives such a training query item;

a subregion identifying portion operable, for each said subdivision

of said region, to identify which said subregion of the subdivision contains

the point representing the received training query item;

a partial answer retrieval portion having access when the apparatus

is in use to a store of said precalculated partial answers for at least some

said subregions of said subdivisions, and operable to retrieve from the

store the partial answers for the [[or each]] identified subregion that is

present in the store;

an iteration portion which performs at least first and second

iterations, corresponding respectively to said first and second

subdivisions, and operable in each such iteration to update the partial

answer stored for the identified subregion of the corresponding

subdivision in dependence upon said known answer to said received

training query item and said retrieved precalculated partial answer for the

identified subregion, and to adjust said known answer in dependence

upon that updated partial answer so that the adjusted known answer is

usable by a subsequent iteration, if any.

23. (Original) Data updating apparatus according to claim 22,

wherein said iteration portion is further operable in each such iteration to

update the partial answer stored for one or more subregions surrounding

the identified subregion.

24. (Original) Data updating apparatus according to claim 22, further comprising a count value retrieval portion having access when the apparatus is in use to a store of precalculated count values for at least some said subregions of said subdivision, and operable to retrieve from the store the count values for the or each identified subregion that is present in the store, and wherein said iteration portion is operable in each such iteration to update the partial answer stored for the identified subregion of the corresponding subdivision in dependence upon said known answer to said received training query item, said retrieved precalculated partial answer for the identified subregion, and said retrieved count value for the identified subregion.

25. (Original) Data updating apparatus according to claim 24, wherein the partial answer is updated by calculating a first value equal to the known answer minus the partial answer and a second value equal to the count value plus one, and adding to the partial answer the result of the first value divided by the second value.

26. (Original) Data updating apparatus according to claim 24, wherein said iteration portion is operable to update the count value stored for the identified subregion of the corresponding subdivision in dependence upon said retrieved count value for the identified subregion.

27. (Original) Data updating apparatus according to claim 26, wherein said count value stored for the identified subregion is updated by incrementing it.

28. (Currently amended) Data updating apparatus according to claim 22, wherein said known answer is adjusted by subtracting from [[it]] said known answer the updated partial answer.

29. (Currently amended) A computer-implemented data processing method for evaluating answers to respective query items considered to be represented by respective points within a region of feature space, which region is subdivided into subregions according to at least first and second subdivisions, said method comprising:

receiving such a query item;

identifying, for each said subdivision of said region, which said subregion of the subdivision contains the point representing the received query item;

accessing a store of precalculated partial answers for at least some said subregions of said subdivisions to retrieve from the store the partial answers for the [[or each]] identified subregion that is present in the store;

calculating an answer to said received query item based on the retrieved partial answers; and

outputting the calculated answer.

30. (Original) A computer-implemented data training method for analyzing query items, considered to be represented by respective training points within a region of feature space, and respective known answers to the query items to determine partial answers for use in evaluating answers to new query items, said method comprising:

subdividing said region into subregions according to at least first and second subdivisions;

performing at least first and second iterations, corresponding respectively to said first and second subdivisions, and in each said iteration calculating a partial answer for each subregion of the corresponding subdivision in dependence upon known answers to query items represented by training points, if any, in the subregion concerned and adjusting said known answers in dependence upon those partial answers so that the adjusted known answers are usable by a subsequent iteration, if any; and

outputting the calculated partial answers.

31. (Currently amended) A computer-implemented data updating method for analyzing training query items and respective known answers to the training query items, said training query items being considered to be represented by respective training points within a region of feature space and said region being subdivided into subregions according to at

least first and second subdivisions, to update precalculated partial

answers usable to evaluate answers to new query items, said

method comprising:

receiving such a training query item;

identifying, for each said subdivision of said region, which said

subregion of the subdivision contains the point representing the received

training query item;

accessing a store of said precalculated partial answers for at least

some said subregions of said subdivisions to retrieve from the store the

partial answers for the [[or each]] identified subregion that is present in the

store; and

performing at least first and second iterations, corresponding

respectively to said first and second subdivisions, and in each such

iteration updating the partial answer stored for the identified subregion of

the corresponding subdivision in dependence upon said known answer to

said received training query item and said retrieved precalculated partial

answer for the identified subregion, and adjusting said known answer

in dependence upon that updated partial answer so that the adjusted

known answer is usable by a subsequent iteration, if any.

32. (Currently amended) A computer-readable recording medium

storing a program for evaluating answers to respective query items

considered to be represented by respective points within a region of

feature space, which region is subdivided into subregions according to at

least first and second subdivisions, said program comprising:

a receiving code portion which receives such a query item;

a subregion identifying code portion which identifies, for each said

subdivision of said region, which said subregion of the subdivision

contains the point representing the received query item;

a partial answer retrieval code portion which accesses a store of

precalculated partial answers for at least some said subregions of said

subdivisions to retrieve from the store the partial answers for the [[or]]

[[each]] identified subregion that is present in the store;

an answer calculation code portion which calculates an answer to

said received query item based on the retrieved partial answers; and

an output code portion which outputs the calculated answer.

33. (Original) A computer-readable recording medium storing a

program for analyzing query items, considered to be represented by

respective training points within a region of feature space, and respective

known answers to the query items to determine partial answers for use in

evaluating answers to new query items, said program comprising:

a region subdividing code portion which subdivides said region into

subregions according to at least first and second subdivisions;

an iteration code portion which performs at least first and second

iterations, corresponding respectively to said first and second

subdivisions, and in each said iteration calculating a partial answer for each subregion of the corresponding subdivision in dependence upon known answers to query items represented by training points, if any, in the subregion concerned and adjusting said known answers in dependence upon those partial answers so that the adjusted known answers are usable by a subsequent iteration, if any; and

an output code portion which outputs the calculated partial answers.

34. (Currently amended) A computer-readable recording medium storing a program for analyzing training query items and respective known answers to the training query items, said training query items being considered to be represented by respective training points within a region of feature space and said region being subdivided into subregions according to at least first and second subdivisions, to update precalculated partial answers usable to evaluate answers to new query items, said program comprising:

an input code portion which receives such a training query item;

a subregion identifying code portion which identifies, for each said subdivision of said region, which said subregion of the subdivision contains the point representing the received training query item;

a partial answer retrieval code portion which accesses a store of

said precalculated partial answers for at least some said subregions of

said subdivisions to retrieve from the store the partial answers for the

[[or each]] identified subregion that is present in the store; and

an iteration code portion which performs at least first and second

iterations, corresponding respectively to said first and second

subdivisions, and in each such iteration updating the partial answer stored

for the identified subregion of the corresponding subdivision in

dependence upon said known answer to said received training query item

and said retrieved precalculated partial answer for the identified

subregion, and adjusting said known answer in dependence upon that

updated partial answer so that the adjusted known answer is usable by a

subsequent iteration, if any.

35. (Original) A computer-readable recording medium storing partial

answers created by a computer-implemented data training method for

analyzing query items, considered to be represented by respective training

points within a region of feature space, and respective known answers to

the query items to determine partial answers for use in evaluating answers

to new query items, said method comprising:

subdividing said region into subregions according to at least first

and second subdivisions;

performing at least first and second iterations, corresponding

respectively to said first and second subdivisions, and in each said

iteration calculating a partial answer for each subregion of the

corresponding subdivision in dependence upon known answers to query

items represented by training points, if any, in the subregion concerned

and adjusting said known answers in dependence upon those partial

answers so that the adjusted known answers are usable by a subsequent

iteration, if any; and

outputting the calculated partial answers.

36. (Currently amended) Data processing apparatus for evaluating

answers to respective query items considered to be represented by

respective points within a region of feature space, which region is

subdivided into subregions according to at least first and second

subdivisions, said apparatus comprising:

an input for receiving such a query item;

subregion identifying means operable, for each said subdivision of

said region, to identify which said subregion of the subdivision contains

the point representing the received query item;

partial answer retrieval means having access when the apparatus

is in use to a store of precalculated partial answers for at least some said

subregions of said subdivisions, and operable to retrieve from the

store the partial answers for the [[or each]] identified subregion that is

present in the store;

answer calculation means for calculating an answer to said

received query item based on the retrieved partial answers; and

an output for outputting the calculated answer.

37. (Original) Data training apparatus for analyzing query items,

considered to be represented by respective training points within a region

of feature space, and respective known answers to the query items to

determine partial answers for use in evaluating answers to new query

items, said apparatus comprising:

region subdividing means operable to subdivide said region into

subregions according to at least first and second subdivisions;

iteration means for performing at least first and second iterations,

corresponding respectively to said first and second subdivisions, and

operable in each said iteration to calculate a partial answer for each

subregion of the corresponding subdivision in dependence upon known

answers to query items represented by training points, if any, in the

subregion concerned and to adjust said known answers in dependence

upon those partial answers so that the adjusted known answers are

usable by a subsequent iteration, if any; and

output means for outputting the calculated partial answers.

38. (Original) Data updating apparatus for analyzing training query items and respective known answers to the training query items, said training query items being considered to be represented by respective training points within a region of feature space and said region being subdivided into subregions according to at least first and second subdivisions, to update precalculated partial answers usable to evaluate answers to new query items, said apparatus comprising:

an input for receiving such a training query item;

subregion identifying means operable, for each said subdivision of said region, to identify which said subregion of the subdivision contains the point representing the received training query item;

partial answer retrieval means having access when the apparatus is in use to a store of said precalculated partial answers for at least some said subregions of said subdivisions, and operable to retrieve from the store the partial answers for the [[or each]] identified subregion that is present in the store;

iteration means for performing at least first and second iterations, corresponding respectively to said first and second subdivisions, and operable in each such iteration to update the partial answer stored for the identified subregion of the corresponding subdivision in dependence upon said known answer to said received training query item and said retrieved precalculated partial answer for the identified subregion, and to

adjust said known answer in dependence upon that updated partial

answer so that the adjusted known answer is usable by a subsequent

iteration, if any.

Allowable Subject Matter

2. Claims 1-38 are allowed.

3. The following is a statement of reasons for the indication of allowable

subject matter: the prior arts of records, neither anticipates nor

renders obvious the following limitations as claimed:

As to claim 1, the prior art of records fail to anticipate or suggest a

data processing apparatus for evaluating answers to respective query

items considered to be represented by respective points within a region of

feature space, which region is subdivided into subregions according to at

least first and second subdivisions, together with the other limitations of

the independent claims.

As to claim 14, the prior art of records fail to anticipate or suggest a

data training apparatus for analyzing query items, considered to be

represented by respective training points within a region of feature space,

and respective known answers to the query items to determine partial

answers for use in evaluating answers to new query items, together with

the other limitations of the independent claims.

As to claim 22, the prior art of records fail to anticipate or suggest a data updating apparatus for analyzing training query items and respective known answers to the training query items, together with the other limitations of the independent claims.

As to claim 29, the prior art of records fail to anticipate or suggest a computer-implemented data processing method for evaluating answers to respective query items, together with the other limitations of the independent claims.

As to claim 30, the prior art of records fail to anticipate or suggest a computer-implemented data training method for analyzing query items, together with the other limitations of the independent claims.

As to claim 31, the prior art of records fail to anticipate or suggest a computer-implemented data updating method for analyzing training query items and respective known answers to the training query item, together with the other limitations of the independent claims.

As to claim 32, the prior art of records fail to anticipate or suggest a computer-readable recording medium storing a program for evaluating answers to respective query items, together with the other limitations of the independent claims.

As to claim 33, the prior art of records fail to anticipate or suggest a computer-readable recording medium storing a program for analysing query items, together with the other limitations of the independent claims.

As to claim 34, the prior art of records fail to anticipate or suggest a computer-readable recording medium storing a program for analysing training query items and respective known answers to the training query items, together with the other limitations of the independent claims.

As to claim 35, the prior art of records fail to anticipate or suggest a computer-readable recording medium storing partial answers created by a computer-implemented data training method for analysing query items, together with the other limitations of the independent claims.

As to claim 36, the prior art of records fail to anticipate or suggest a data processing apparatus for evaluating answers to respective query items, together with the other limitations of the independent claims.

As to claim 37, the prior art of records fail to anticipate or suggest a data training apparatus for analysing query items, together with the other limitations of the independent claims.

As to claim 38, the prior art of records fail to anticipate or suggest a data updating apparatus for analysing training query items and respective known answers to the training query items, together with the other limitations of the independent claims.

Conclusion

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Belix M. Ortiz whose telephone number is 703-305-7605, and after October 21, 2004 my new telephone number is going to be (571)-272-4081. The examiner can normally be reached on moday-friday 9am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dov Popovici can be reached on 703-305-3830 and after October 21, 2004 his new telephone number is going to be (571)- 272-4083. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained

from the Patent Application Information Retrieval (PAIR) system. Status

information for published applications may be obtained from either Private

PAIR or Public PAIR. Status information for unpublished applications is

available through Private PAIR only. For more information about the PAIR

system, see http://pair-direct.uspto.gov. Should you have questions on

access to the Private PAIR system, contact the Electronic Business

Center (EBC) at 866-217-9197 (toll-free).

bmo

October 15, 2004.

CHARLES RONES
PRIMARY EXAMINER